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(71) Applicant(s)
Pentax Corporation
(Incorporated in Japan)
36-9 Maenocho 2-chome, Itabashi-ku,
Tokyo, Japan

(72) Inventor(s)
Ken Hirunuma
Gouji Funatsu
Masami Shirai

(74) Agent and/or Address for Service
Ablett & Stebbing
Caparo House, 101-103 Baker Street,
LONDON, W1U 6FQ, United Kingdom

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Other: WPI, EPODOC, JAPIO

(54) Abstract Title
Binocular telescope with photographing function.

(57) A binocular telescope 10 has a digital still or video camera providing images that may be viewed on an LCD screen 18 or be output via a connecting terminal such as a video terminal 36 or USB terminal 38 for still images - for example for transmission to a computer. Data terminals 36, 38 are provided on the front of the binocular body or casing. Binocular telescope 10 is in two parts, comprising movable left and fight portions 10L, 10R, allowing the spacing of lenses 14R and 14L to be varied (see Figure 3). One binocular body part 10L may comprise a battery compartment 45, and both the battery compartment and the output or data terminals 36, 38 may have hinged covers 46, 34. LCD screen 18 may be a flip up display, hinged to the main body.

FIG.5

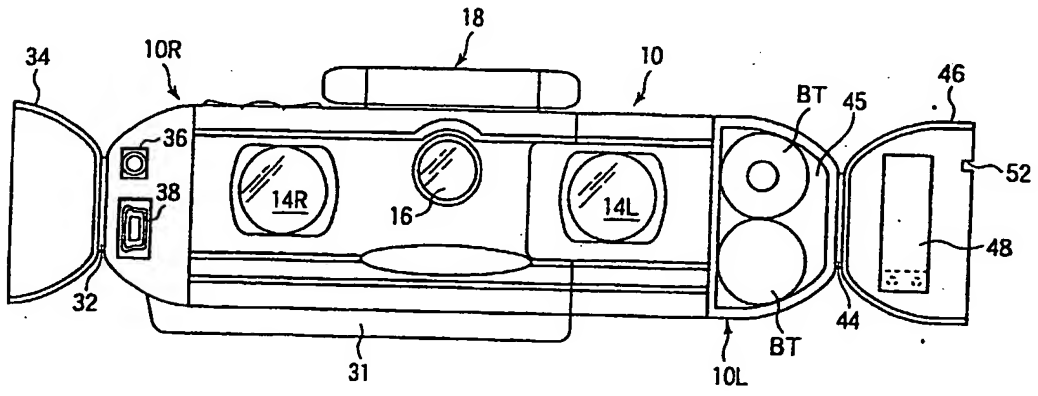

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FIG.1

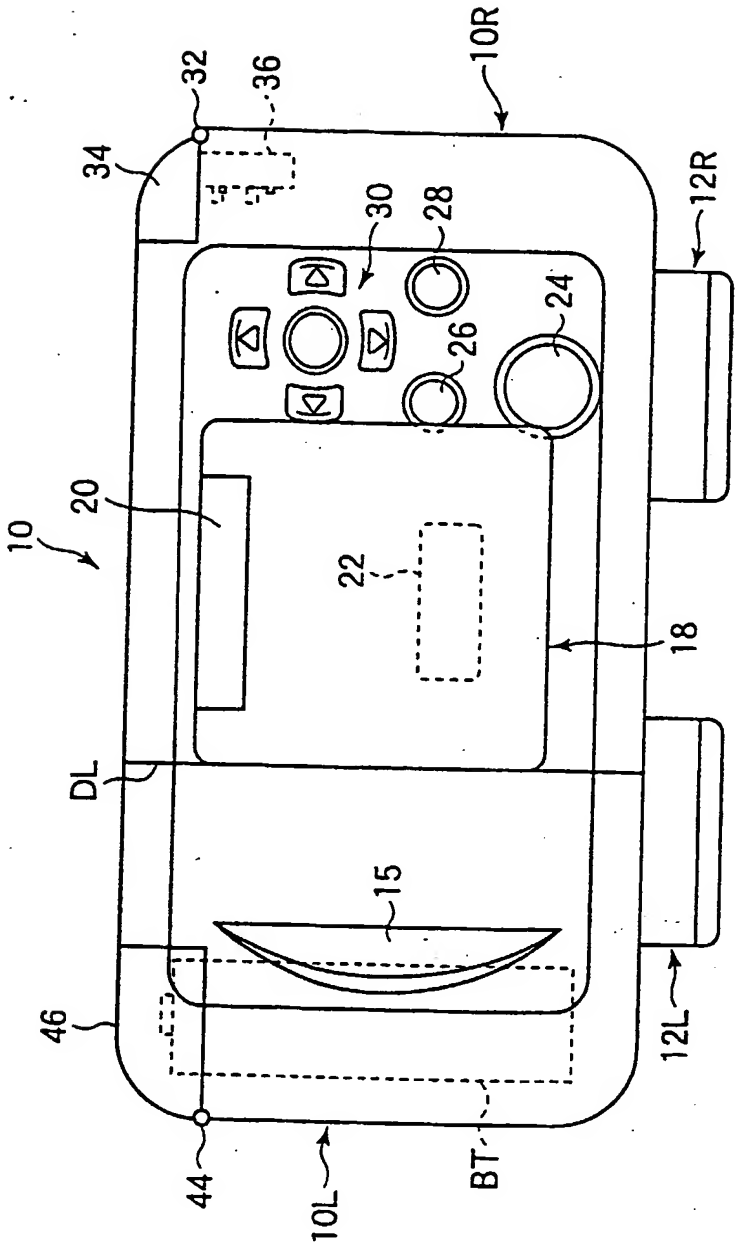


FIG.2

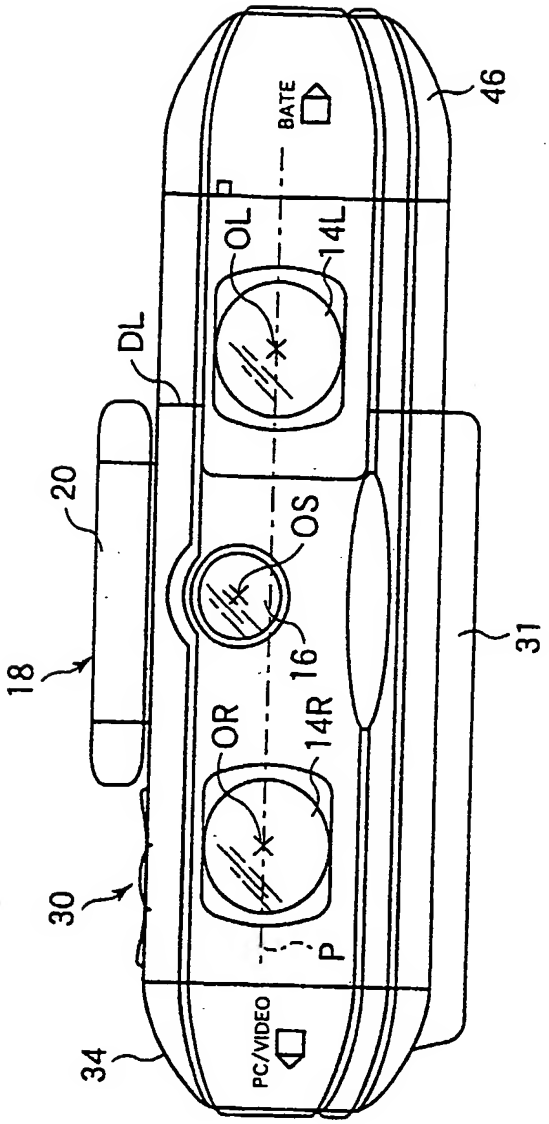


FIG.3

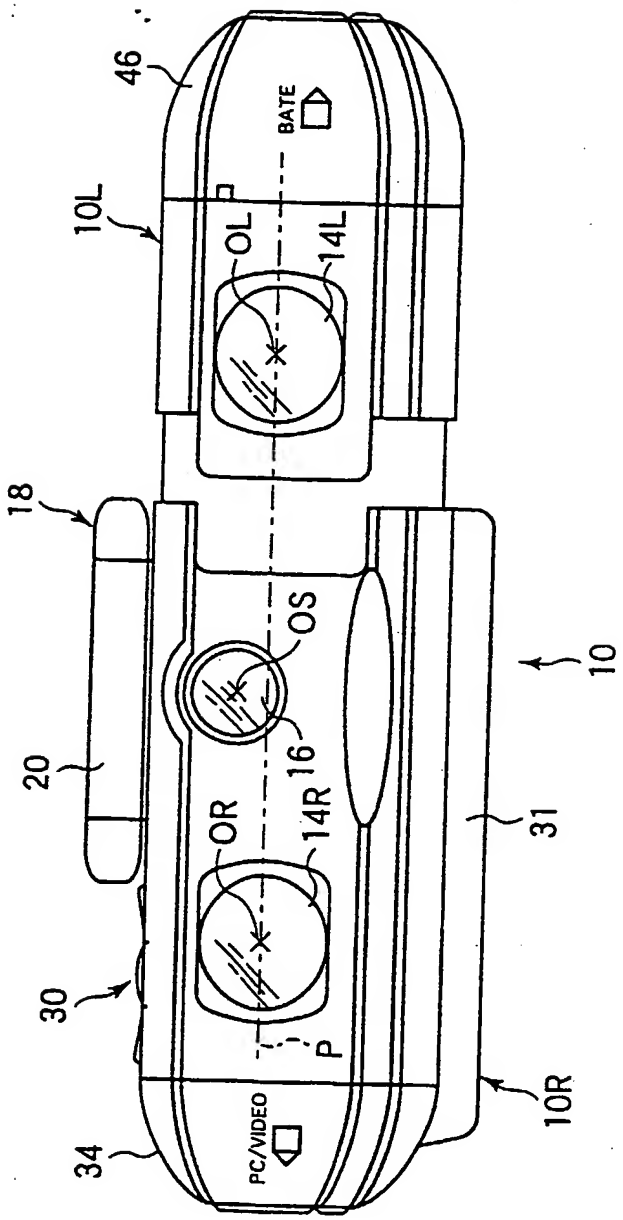


FIG.4

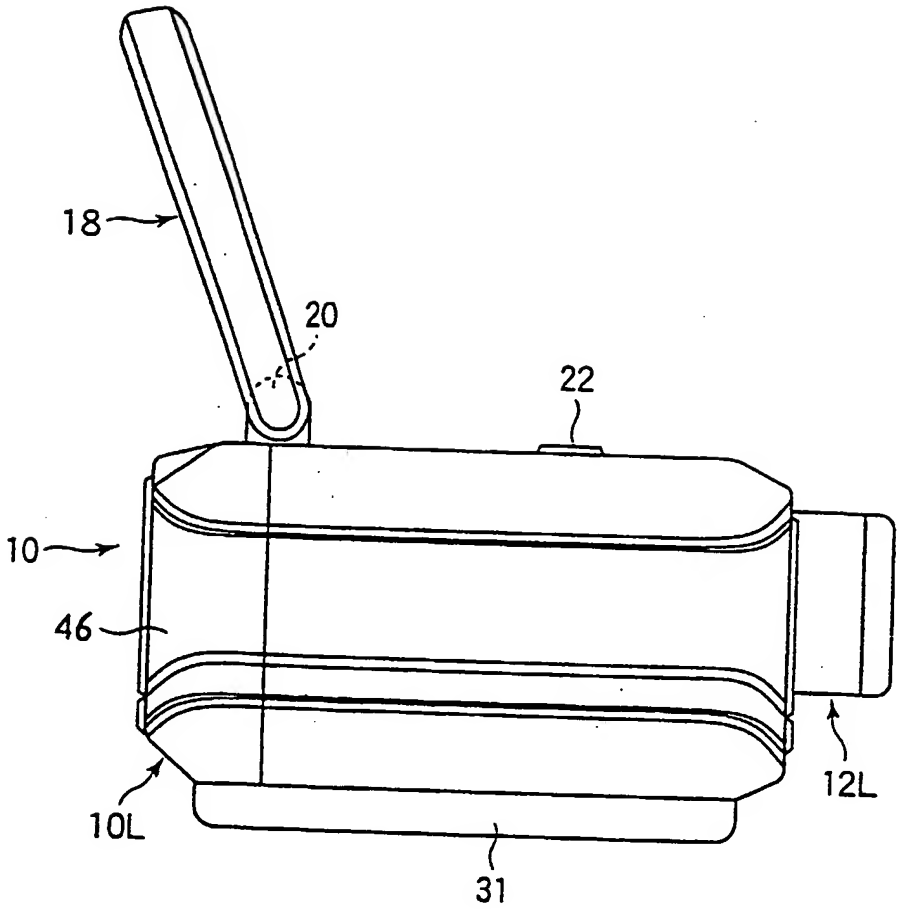


FIG.5

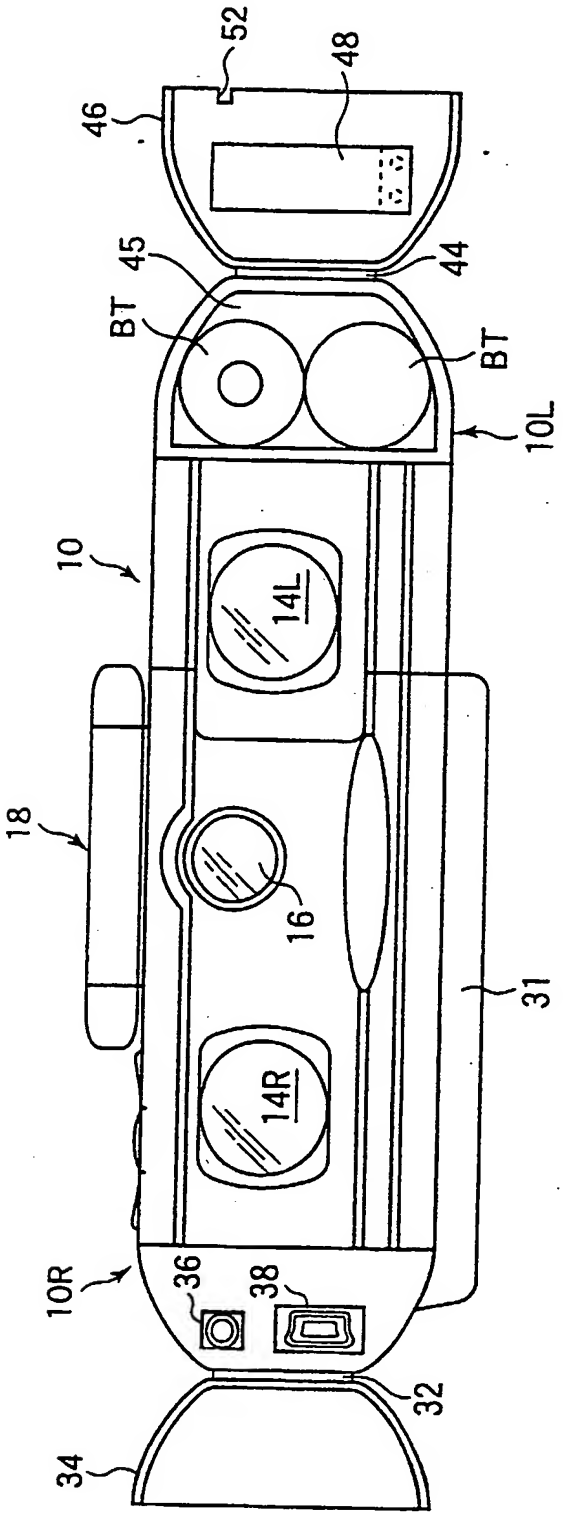


FIG.6

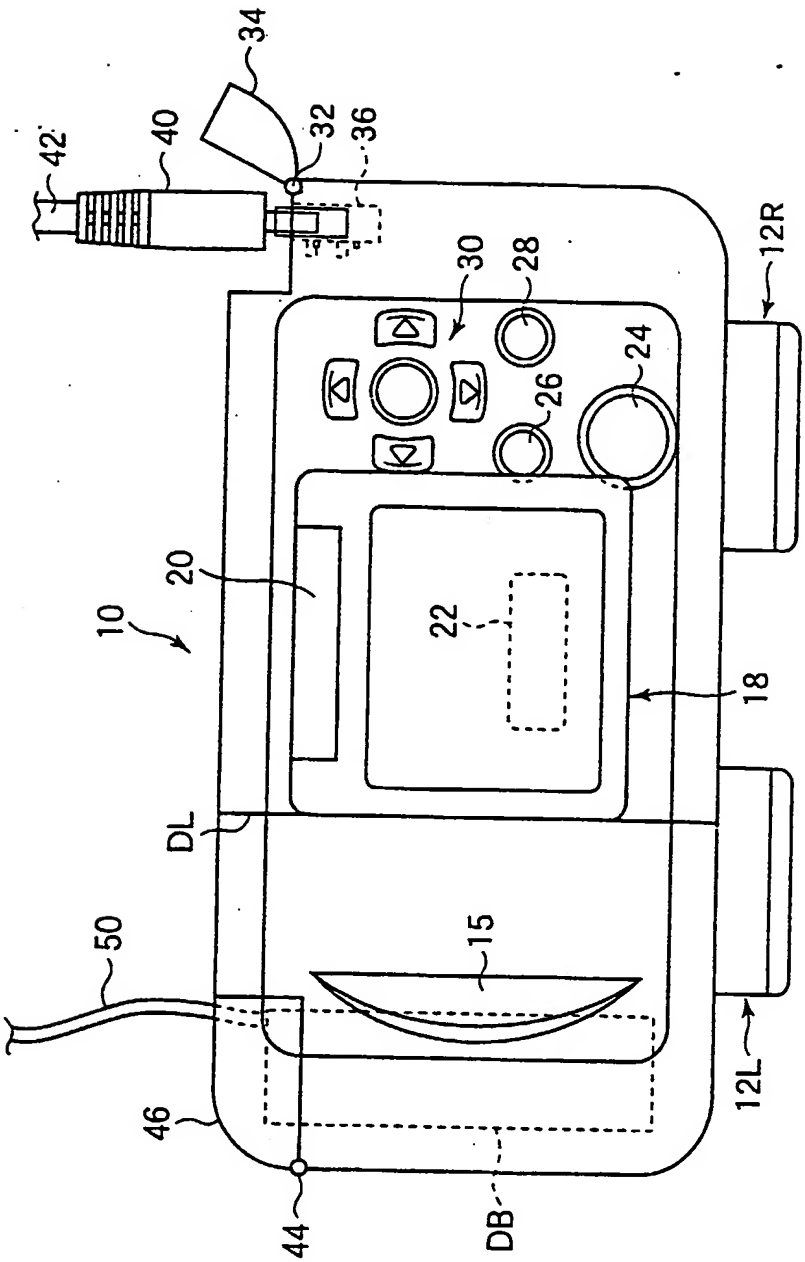
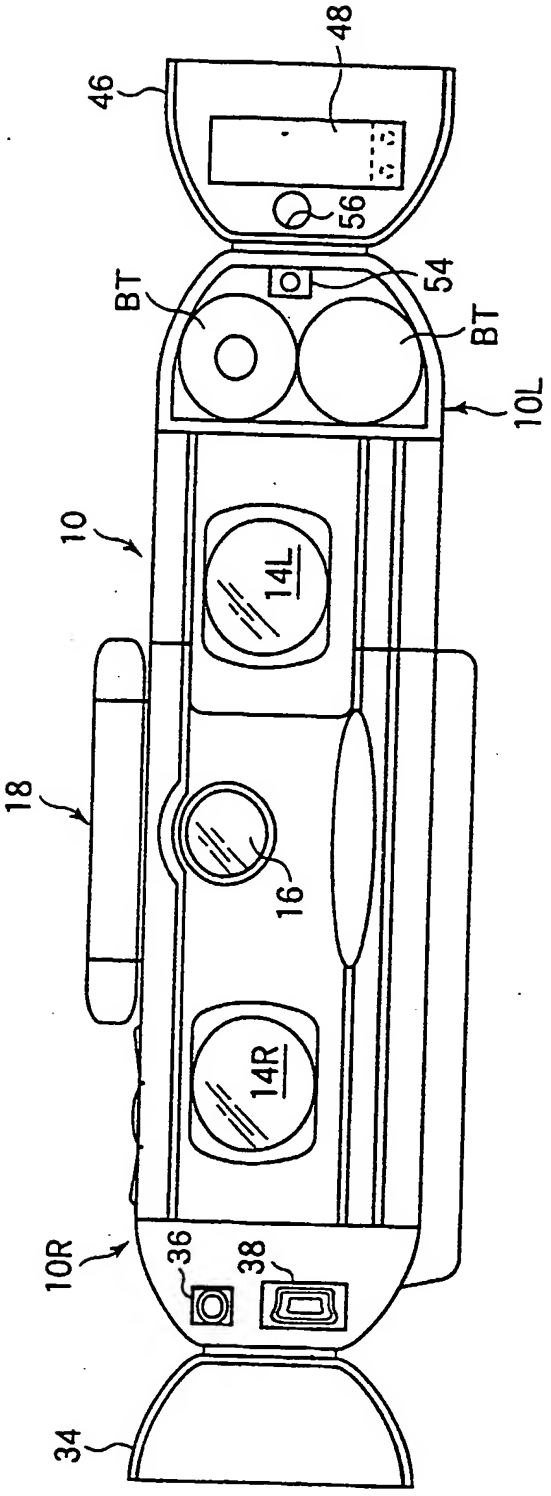


FIG.7



BINOCULAR TELESCOPE WITH PHOTOGRAPHING FUNCTION

The present invention relates to a binocular telescope with a photographing function.

As is well known, a binocular telescope is used for watching sports, wild birds, and so on. When using such a binocular telescope, it is often the case that the user sees something that he or she would like to photograph. Typically, he or she will fail to photograph the desired scene because he or she must change a camera for the binocular telescope and during this time the chance is lost. For this reason, a binocular telescope containing a digital camera is proposed, whereby a photograph can be taken immediately by using the digital camera contained in the binocular telescope while continuing the observation through the binocular telescope.

The binocular telescope can be provided with an output terminal such as a video terminal and a USB terminal in a similar way as a usual digital camera, so that a subject image captured by the binocular telescope can be indicated on a TV monitor, for example, as a moving image, or transmitted to a personal computer, in real time.

On the other hand, to ensure uninterrupted operation of the binocular telescope for a long time, it is necessary to provide the binocular telescope with an AC power source or a large-capacity power pack. In this case, the binocular

telescope has to be provided with an external power source input terminal.

The main function of the binocular telescope is that of a pair of binoculars. Namely, the time for which the binocular telescope is held by hand is much longer than the time a camera is held. Therefore, both side surfaces of the casing of the binocular telescope should be shaped so that the user can hold the binocular telescope stably for a long time. However, if the binocular telescope is small sized as disclosed in Japanese Unexamined Patent Publication No. 10-115764, i.e., a flat type binocular telescope, in which the casings can be slidably moved rightward and leftward to adjust the distance between the optical axes of the right and left telescopic optical systems, the degree of freedom is not high enough to arrange the output terminal or the external power source input terminal on any surface of the binocular telescope.

Therefore, an object of the present invention is to provide a binocular telescope with a photographing function, in which an output terminal or an input terminal is provided so as not to disturb the handling of the binocular telescope.

According to the present invention, there is provided a binocular telescope with a photographing function, the binocular telescope comprising a casing having a front wall, a camera that is provided with an imaging device, and a

connecting terminal that outputs image data obtained by the camera to a device outside the binocular telescope. The connecting terminal is provided on the front wall.

The binocular telescope may further comprise a lid that opens and closes to cover the connecting terminal. In this case, the lid is provided on the front wall.

When the casing comprises first and second casing sections in which right and left telescopic optical systems are housed, and the first and second casing sections are movable relative to each other in such a manner that the distance between the optical axes of the first and second telescopic optical systems is adjusted, the connecting terminal is provided on an end portion of one of the first and second casing sections.

The connecting terminal may comprise a video terminal or a USB terminal.

Further, according to the present invention, there is provided a binocular telescope with a photographing function, the binocular telescope may comprise a casing having a front wall and a battery chamber, in which a battery is housed, and which has an opening provided on the front wall to change the battery, and a lid that opens and closes the opening.

In the binocular telescope, a dummy battery may be housed in the battery chamber when electric power is supplied to the binocular telescope from an external power source. The

dummy battery and the power source are connected through a power supply cord. In this case, the lid has a notch, through which the power supply cord passes.

The battery chamber may be provided with an external power source input terminal, to which a connector, provided on an external power source input terminal connected to an external power source, is connected. In this case, the lid has an access hole, through which the power supply cord passes.

The casing may comprise first and second casing sections in which right and left telescopic optical systems are housed. The first and second casing sections are movable relative to each other in such a manner that the distance between the optical axes of the first and second telescopic optical systems is adjusted. The battery chamber is disposed in an end portion of one of the first and second casing sections.

Furthermore, according to the present invention, there is provided a binocular telescope with a photographing function, comprising a casing, a camera, and a connecting terminal. The casing has first and second casing sections in which right and left telescopic optical systems are housed. The first and second casing sections are movable relative to each other in such a manner that the distance between the optical axes of the first and second telescopic optical systems is adjusted. The first casing section is provided

with a battery chamber at an outer end portion thereof, in which a battery is housed. The camera is provided with an imaging device. The connecting terminal outputs image data obtained by the camera to a device outside of the binocular telescope. The connecting terminal is provided at an outer end portion of the front wall of the second casing section.

Examples of the present invention will now be described with reference to the accompanying drawings in which:-

Fig. 1 is a plan view of a flat type binocular telescope with a photographing function, to which a first embodiment of the present invention is applied;

Fig. 2 is a front view of the flat type binocular telescope of Fig.1, in which a movable casing section is pushed into a main casing section;

Fig. 3 is a front view of the flat type binocular telescope of Fig.1, in which the movable casing section is pulled out of the main casing section;

Fig. 4 is a side view of the flat type binocular telescope of Fig.1;

Fig. 5 is a front view of the flat type binocular telescope of Fig.1, in which a terminal lid and a battery lid are open;

Fig. 6 is a plan view of the flat type binocular telescope of Fig.1, in which a video connector is connected to a video terminal, and a dummy battery is mounted in a

battery chamber; and

Fig. 7 is a front view of a second embodiment of a flat type binocular telescope.

The present invention will be described below with reference to the embodiments shown in the drawings.

Fig. 1 shows a plan view of a first embodiment of a flat type binocular telescope with a photographing function, and Fig. 2 shows a front view of the binocular telescope. The binocular telescope has a box-like casing 10, which is composed of a main casing section or right casing section 10R and a movable casing section or left casing section 10L. A pair of telescopic optical systems, i.e., a right telescopic optical system and a left telescopic optical system are housed in the right and left casing sections 10R and 10L. Each of the telescopic optical systems is composed of an objective lens system, an erecting prism system, and an ocular lens system.

The ocular lens systems of the right and left telescopic optical systems are housed in lens barrels 12R and 12L. The objective lens systems 14R and 14L of the right and left telescopic optical systems are fixed to the right and left casing sections 10R and 10L, and the erecting prism systems and the ocular lens systems are movable relative to the objective lens systems, to enable a focusing operation of the pair of telescopic optical systems to be performed. Thus, in

the focusing operation of the telescopic optical systems, the lens barrels 12R and 12L are moved rearward and forward relative to the casing sections 10R and 10L.

The pair of telescopic optical systems are housed in the right and left casing sections 10R and 10L in such a manner that the lens barrels 12R and 12L housing the ocular lens systems are located at a lower side in Fig.1 (as illustrated), which is the eye-side or rear of the binocular telescope. The objective lens systems are located at an upper side in Fig.1 (as illustrated), which is the object side or front of the binocular telescope. Therefore, when a user faces the ocular lens systems, the right and left sides in Fig.1 coincide with the right and left sides for the user.

Note that for simplicity of explanation, in the following description, the terms "right side" and "left side" are defined respectively as the right and left sides when the user faces the ocular lens systems of the telescopic optical systems. Further the terms "forward" and "rearward" are used to indicate respectively directions toward the objective lens system side and the ocular lens system side of the telescopic optical systems.

In Figs. 1 and 2, the right and left casing sections 10R and 10L are divided at a dividing line DL. The right and left casing sections 10R and 10L are movable relative to each other in the right and left directions about the dividing line DL,

as shown in Fig. 3. Since the right and left telescopic optical systems are mounted in the right and left casing sections 10R and 10L, when the right and left casing sections 10R and 10L are relatively moved in the right and left directions, the distance between the optical axes of the right and left telescopic optical systems, i.e., the interpupillary distance, is adjusted.

A crescent-like recess 15 is formed on an upper surface of the movable casing section or left casing section 10L. The user can make his or her finger engage with the crescent-like recess 15, so that the left casing section 10L can easily be pulled out of the right casing section 10R.

A photographing optical system 16 is assembled in the main casing section or right casing section 10R. The photographing optical system 16 is housed in a lens barrel (not shown), which is mounted in the right casing section 10R such that the lens barrel is positioned between the right and left telescopic optical systems. Further, a solid state imaging device such as a CCD imaging device is assembled in the right casing section 10R, and arranged at a predetermined position behind the photographing optical system 16. Thus, a digital camera provided with the CCD imaging device and the photographing optical system 16 is housed in the right casing section 10R.

The optical axis OS of the photographing optical system

16 is located between the optical axes OR and OL of the right and left telescopic optical systems which are parallel to each other and parallel to the optical axis OS. As shown in Figs. 2 and 3, the optical axes OR and OL of the right and left telescopic optical systems define a plane P, which is parallel to the optical axis OS of the photographing optical system 16. The right and left telescopic optical systems are moved in parallel to the plane P, so that the distance between the optical axes thereof, i.e., the interpupillary distance is adjusted.

An LCD (liquid crystal display) monitor 18 is provided on an upper surface of the right casing section or main casing section 10R. The LCD monitor 18 is formed as a flat rectangular plate shape. The LCD monitor 18 is arranged in such a manner that its front and rear sides are perpendicular to the optical axis of the photographing optical system 16, and the LCD monitor 18 is rotatable about a rotational shaft 20 provided along the front side. The LCD monitor 18 is usually folded, lowered or closed as shown in Figs. 1-3. In this condition, the display surface of the LCD monitor 18 faces an upper surface of the right casing section 10R, so that the display surface cannot be seen. However, the LCD monitor 18 can be raised as shown in Fig.4, by rotation about the rotational shaft 20, so that the display surface can be seen from the eye-side or rear of the binocular telescope.

A rotary wheel 22 is provided in the right casing section 10R. A part of the rotary wheel 22 is exposed from an upper surface of the right casing section 10R as shown in Fig. 4. The rotary wheel 22 is formed on an outer surface of a rotary wheel cylinder (not shown) rotatably supported in the right casing section 10R. When a user rotates the rotary wheel 22, the rotary wheel cylinder is caused to rotate, which in turn causes the lens barrels 12R and 12L to be moved forward and rearward, thereby enabling a user to perform a focusing operation of the telescopic optical systems. Namely, a movement-conversion mechanism for converting a rotational movement of the rotary wheel cylinder into a 'focusing' movement of the pair of lens barrels 12R and 12L is provided in the rotary wheel cylinder, for the focusing of the telescopic optical systems.

In the present embodiment, the lens barrel of the photographing optical system 16 is housed in the rotary wheel cylinder of the rotary wheel 22, and is moved along the optical axis of the photographing optical system 16 when the rotary wheel cylinder is rotated. Namely, a movement-conversion mechanism for converting a rotational movement of the rotary wheel cylinder into a focusing movement of the lens barrel is provided between the rotary wheel cylinder and the lens barrel, for the focusing of the photographing optical system for the CCD imaging device.

Thus, a user is able to perform a focusing operation of both the right and left telescopic optical systems, and the photographing optical system for the CCD imaging device simultaneously by rotating the rotary wheel 22. Note that, when the LCD monitor 18 is folded as shown in Figs. 1-3, the rotary wheel 22 is covered by the LCD monitor 18.

As shown in Fig. 1, various kinds of switch buttons including a release switch button 24, an object display switch button 26, a menu display switch button 28, and a cross switch button 30 are provided on an upper surface of the right casing section 10R. These switch buttons are arranged in such a manner that, when the LCD monitor 18 is lowered or folded, the switch buttons are exposed on the upper surface of the right casing section 10R near the right side of the LCD monitor 18. A power source switch button is provided on an appropriate portion of the casing 10, for example, an underside surface of the right casing section 10R. The power source switch button is connected to a power switch of an electric circuit. When the power switch is turned OFF, the operation of the release switch button 24 is made invalid. The operation of the release switch is made valid when the power switch is turned ON.

The switch buttons 24, 26, 28, and 30 are connected to switches provided in a control circuit board mounted in the right casing section 10R. The control circuit board is

provided with a microcomputer, which monitors whether or not the switches connected to the switch buttons 24, 26, 28, and 30 are turned ON. When any switch is turned ON, the microcomputer carries out the corresponding operation.

The release switch button 24 is connected to the release switch, and when the release switch is turned ON, a photographing operation is performed in a way described later.

The object display switch button 26 is connected to a select switch for determining whether or not an object image is to be displayed as a moving image, on the display surface of the LCD monitor 18. Immediately after the power switch is turned ON, a non-display state is set, in which no image is displayed on the display surface of the LCD monitor 18. When the object display switch button 26 is depressed to turn the select switch ON, an object image, obtained by the CCD imaging device through the photographing optical system 16, is displayed as a moving image on the display surface of the LCD monitor 18. When the object display switch button 26 is depressed again to activate the select switch, the display surface of the LCD monitor 18 is returned to the non-display state.

The menu display switch button 28 is connected to a select switch for determining whether or not a menu frame is to be displayed on the display surface of the LCD monitor 18. Immediately after the power switch is turned ON, a non-display

state is set. When the menu display switch button 28 is depressed to turn the select switch ON, a menu frame indicating various set options is displayed on the display surface of the LCD monitor 18. Under this condition, one of the set options can be selected by operating the cross switch 30. When the menu display switch button 28 is depressed again, the display surface of the LCD monitor 18 is returned to the non-display state.

When the object display switch button 26 is depressed after the power switch is turned ON, an object image formed on a light-receiving surface of the CCD imaging device is photoelectrically converted into an image signal. The image signal is read from the CCD imaging device at predetermined time intervals, each image signal reading being the image signal for one frame. Each image signal reading is subjected to an imaging process, and converted into one frame of digital image data, which is temporarily stored in a frame memory provided on the control circuit board, and read from the frame memory as a digital video signal. The digital video signal is then converted into an analog video signal, subjected to an imaging process, and transmitted to the LCD monitor 18, so that the object image is displayed as a moving image on the display surface of the LCD monitor 18. If the object display switch button 26 is depressed again, the display surface of the LCD monitor 18 is returned to the non-display state.

When the release switch button 24 is depressed to turn the release switch ON, the one frame of image data stored in the frame memory is read as still image data, and temporarily stored in a memory provided in the microcomputer on the control circuit. The still image data is subjected to a predetermined imaging process by the microcomputer, and written to a memory card, for example, in a predetermined format.

As shown in Fig. 2, an enlarged portion 31 is provided on the underside of the right casing section 10R, and a card holder for the memory card, the control circuit board, and so on are housed in the enlarged portion. The memory card is detachably attached to the card holder. After the still image data is recorded in the memory card, the memory card can be detached from the card holder, and mounted in a memory card driver of an image processing computer so that the still image data can, for example, be subjected to an imaging process, and printed.

In the present embodiment, a video signal for displaying the object image on the LCD monitor 18 can be transmitted from the binocular telescope to a remote device, so that the object image can be displayed, for example, by an external TV monitor device. Thus, the object image obtained using the binocular telescope can be seen by a plurality of observers viewing the external TV monitor device.

Further, in the present embodiment, the binocular telescope with a photographing function can be connected to a portable personal computer, so that still image data recorded in the memory card can be transmitted to the portable personal computer as needed. Using a personal computer and/or a cellular telephone, a still image obtained by the binocular telescope can be transmitted instantly to anywhere in the world.

In the present embodiment, as shown in Fig. 5, a video terminal 36 for video signal transmission and a USB terminal 38 for still image data transmission are provided in the binocular telescope, and are disposed in a right end portion of a front wall of the main casing section or right casing section 10R. Namely, a rotational shaft 32 is fixed to the right end portion of the front wall of the right casing section 10R, and a terminal lid 34 is rotatably supported by the rotational shaft 32 in such a way that a user may open and close the terminal lid 34 to respectively uncover and cover the connecting terminals 36 and 38.

As shown in Fig. 6, when a video connector 40 is connected to the video terminal 36, a connecting cord 42 connected to the video connector 40 extends from the front wall of the right casing section 10R. Therefore, when the right side portion of the right casing section 10R is held by the right hand of the user to observe an object with the

binocular telescope, the connecting cord does not interfere with the handling of the binocular telescope.

On the other hand, as shown in Fig. 1, a battery chamber is formed in a left end portion of the movable casing section or left casing section 10L. The battery chamber is open at the front wall of the left casing section 10L, and the opening may be uncovered and covered by a user respectively opening and closing a battery lid 46, which is rotatably supported by a rotational shaft 44. As shown in Fig. 5, in which the battery lid 46 is open, two batteries BT are housed in the battery chamber 45, and the different electrodes of the batteries BT are exposed.

As shown in Fig. 5, a conducting leaf spring 48, made of appropriate metal, is attached to a rear surface of the battery lid 46. When the battery lid 46 is closed as shown in Fig. 1, the conducting leaf spring 48 comes into contact with the electrodes of the two batteries BT, so that the batteries are electrically connected to each other. Further, when the battery lid 46 is closed, the conducting leaf spring 48 urges the two batteries into the battery chamber 45, so that electrodes provided on the opposite ends of the batteries firmly come into electrical contact with an electric terminal (not shown).

In the present embodiment, instead of the batteries BT, an external power source such as an AC power source adaptor

or a large-capacity power pack can be utilized. When the AC power source adaptor or the large-capacity power pack is used, the batteries BT are removed from the battery chamber 45, and a dummy battery DB is mounted in the battery chamber 45 as shown in Fig. 6, for operation as a power supply connector. The dummy battery DB has a shape which resembles the two batteries BT, so that the dummy battery DB fits tightly in the battery chamber 45. A tip portion of the dummy battery DB is provided with power supply terminals. When the dummy battery DB is housed in the battery chamber 45, the power supply terminals of the battery chamber 45 and the power supply terminals of the dummy battery DB come into contact with each other, so that electric power can be supplied from the AC power source adaptor or the large-capacity power pack to the binocular telescope.

A power supply cord 50 extends from the dummy battery DB, to the AC power source adaptor or the large-capacity power pack. As shown in Fig. 5, a notch 52 is formed on an edge of the battery lid 46, opposite the rotational shaft 44, and thus, when the battery lid 46 is closed as shown in Fig. 6, the power supply cord 50 passes through the notch 52, and extends outside the binocular telescope. Thus, since the power supply cord 50 extends from the front wall of the left casing section 10L, when the left side portion of the left casing section 10L is held by the left hand of the user to

observe an object with the binocular telescope, the power supply cord does not interfere with the handling of the binocular telescope.

With reference to Fig. 7, a second embodiment of the present invention is described. Fig. 7 corresponds to Fig. 5 of the first embodiment, and in Fig. 7, the corresponding parts to those of Fig. 5 are indicated by the same reference numerals.

In the embodiment shown in Figs. 1-6 (the first embodiment), when electric power is supplied from the AC power source adaptor or the large-capacity power pack to the binocular telescope, a dummy battery is used as a power supply connector. Conversely, in the second embodiment shown in Fig. 7, a normal type power supply connector is used. Namely, as shown in Fig. 7, the battery chamber 45 is provided with a socket 54, which operates as an external power source input terminal, to which a connector, provided on an external power source input terminal connected to an external power source, is connected. An access hole 56 is formed in the battery lid 46, to align with the socket 54 when the battery lid 46 is closed. Namely, the normal type power supply connector is connected to the socket 54 through the access hole 56, so that electric power is supplied from the AC power source adaptor or the large-capacity power pack to the binocular telescope.

In the first and second embodiments, the video terminal

and the USB terminal are provided in the main or right casing section, while the battery chamber is formed in the movable or left casing section. However, the battery chamber may be formed in the right casing section, while the video terminal and the USB terminal are provided in the left casing section.

Further, the first and second embodiments are applied to a flat type binocular telescope, which is the optimum type of binoculars having a photographing function, since the parallax between the photographed area and the observed area is minimum and the portability is good. However, the present invention can be applied to other binoculars in which interpupillary distance is adjusted by rotating the telescopic optical systems about the photographing optical system.

As described above, in the binocular telescope of the embodiments, since output terminals such as the video terminal and the USB terminal are arranged on the front wall of the casing, when a connecting cord is connected to the output terminal, the connecting cord extends from the front wall. Therefore, when a user holds the casing, the user's grip is not interfered with by the connecting cord. Further, if an external power source such as an AC power source adaptor or a large-capacity power pack is used for the binocular telescope, the power supply cord extends from the front wall of the casing so that when a user holds the casing, the user's grip is not interfered with by the connecting cord. Thus,

observation and photography can be performed stably, even when a power supply cord and/or a connecting cord extends from the binocular telescope.

Although the embodiments of the present invention have been described herein with reference to the accompanying drawings, modifications and changes may be made by those skilled in this art without departing from the scope of the invention.

CLAIMS

1. A binocular telescope with a photographing function, the binocular telescope comprising:-

a casing having a front wall;

a camera having an imaging device; and

a connecting terminal for outputting image data obtained by said camera to a device outside said binocular telescope, said connecting terminal being provided on said front wall.

2. A binocular telescope according to claim 1, further comprising a lid, wherein said lid is openable and closable for uncovering and covering said connecting terminal, and wherein said lid is provided on said front wall.

3. A binocular telescope according to claim 1 or 2, wherein said casing comprises first and second casing sections in which right and left telescopic optical systems are housed, said first and second casing sections being movable relative to each other for adjusting the distance between the optical axes of said first and second telescopic optical systems, and wherein said connecting terminal is provided on an end portion of one of said first and second casing sections.

4. A binocular telescope according to any preceding claim, wherein said connecting terminal comprises a video terminal.

5. A binocular telescope according to any preceding claim, wherein said connecting terminal comprises a USB terminal.

6. A binocular telescope with a photographing function, the binocular telescope comprising:-

a casing having a front wall;

a battery chamber for housing a battery, said battery chamber having an opening provided on said front wall for changing said battery; and

a lid for opening and closing said opening.

7. A binocular telescope according to claim 6, wherein a dummy battery is housed in said battery chamber for supplying electric power to said binocular telescope from an external power source, said dummy battery and said power source being connected through a power supply cord, and wherein said lid has a notch, through which said power supply cord passes.

8. A binocular telescope according to claim 6, wherein said battery chamber is provided with an external power source input terminal for connection to a connector, provided on an external power source input terminal connected to an external power source, and wherein said lid has an access hole through which said power supply cord passes.

9. A binocular telescope according to any preceding claim, wherein said casing comprises first and second casing sections in which right and left telescopic optical systems are housed, said first and second casing sections being movable relative to each other for adjusting the distance between the optical axes of said first and second telescopic optical systems, and

wherein said battery chamber is disposed in an end portion of one of said first and second casing sections.

10. A binocular telescope with a photographing function, said binocular telescope comprising:-

a casing having first and second casing sections in which right and left telescopic optical systems are housed, said first and second casing sections being movable relative to each other for adjusting the distance between the optical axes of said first and second telescopic optical systems, wherein said first casing section is provided with a battery chamber for housing a battery, and wherein said second casing section is provided with a front wall;

a camera having an imaging device; and

a connecting terminal for outputting image data obtained by said camera to a device outside said binocular telescope, said connecting terminal being provided at an outer end portion of said front wall of said second casing section.

11. A binocular telescope with a photographing function, the binocular telescope substantially as herein described with reference to the accompanying drawings.

Application No: GB 0303456.8 **Examiner:** Matthew Males
Claims searched: 1 & 10 **Date of search:** 8 July 2003

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance	
X, E	1 - 5, 9, 10	GB 2381152 A	ASAHI KOGAKU KOGYO KK - see pg. 23, line 9 - pg. 24, line 16, and Figs. 2 & 3.
X, E	1 - 5, 9, 10	GB 2381151 A	ASAHI KOGAKU KOGYO KK - see pg. 26, lines 1 - 24, and Figs. 2 & 3.
X	1, 3, 4	US 5963369	STEINTHAL, SHERLOCK - see abstract, col 3, lines 36 - 43, and Figs. 1A, 1B & 2A.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC[v]:

H4F

Worldwide search of patent documents classified in the following areas of the IPC[7]:

H04N

The following online and other databases have been used in the preparation of this search report:

WPI, EPODOC, JAPIO